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Can Economic Growth, Foreign Direct Investment And Exports Provide The Desired Panacea To The Problem Of Unemployment In Nigeria?

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ABSTRACT

Employment generation has over the years been widely celebrated as a major key to socio-economic progress. In recent times, reduction in unemployment has been identified as a chief indicator of economic development. Unfortunately, the problem of unemployment has plagued Nigeria over the years and it has become highly pronounced in recent times. This study seeks to find out if the unemployment problem in Nigeria can be solved through economic growth, exports and foreign direct investment. The study employs contemporary econometric techniques of cointegration and Granger causality tests within error correction modelling framework to analyse the relationship among unemployment, economic growth, exports and foreign direct investment. The study also utilises the VAR techniques of variance decomposition and impulse response functions. The study is based on annual time series data from 1984 to 2010 obtained from the Central Bank of Nigeria (CBN). The results of the study indicate, among other things, that economic growth, exports and foreign direct investment do not provide the desired solution to the problem of unemployment in Nigeria both in the short-run and long-run. Thus adequate mechanism should be put in place to ensure that economic growth, foreign direct investment and exports bring about optimum employment generation.

KEY WORDS: Unemployment, Economic Growth, Foreign Direct Investment, Error Correction Modelling, Exports, Nigeria

INTRODUCTION

A major indicator of socio-economic progress is employment generation. Responsible governments all over the world vigorously strive for the attainment of full employment as a major macroeconomic goal. Indeed, reduction in unemployment has in recent times been recognised as a chief indicator of economic development[19] (Seers, 1972; Todaro & Smith, 2003; Fajingbesi & Uga, 2003). Unfortunately, unemployment has over the years been a major socio-economic problem in both developing and developed countries (Tunah, 2010). In recent times, unemployment has greatly afflicted many countries across the globe due to the global economic meltdown. It is important to state here that unemployment is a leading cause of poverty as well as many social vices and criminal

[19] Other indicators include reduction in poverty and reduction in income/wealth inequality.

activities. Those that are not gainfully employed usually suffer from income deprivation; such ones depend on either received income or some illicit/morally repugnant activities for survival.

Nigeria has in recent times been plagued by the problem of unemployment. It could be recalled that during the first two decades after her independence, Nigeria had unemployment rates that were similar to or less than those of the developed economies; but from the 1980s the country has been experiencing high and significant increases in unemployment rate (Onwioduokit, 2007). In recent times, unemployment has become highly pronounced in Nigeria and it has evidently made many Nigerians to experience low quality of life. It is most preposterous to state here that despite the abundant material resources and potential human resources in Nigeria, many able-bodied men and women that form part of the country's labour force are without jobs. As observed by Onwioduokit (2007), in recent times, the Nigerian labour market has been characterised by high rate of unemployment, low wages and poor working conditions. It is noteworthy that this unwholesome situation is partly caused by the oil boom of the 1970s which attracted great attention to the oil sector while many other productive sectors were neglected; thus the fortunes of these productive sectors declined. Other reasons for the high rate of unemployment in Nigeria include poor national economic planning, uncontrolled and high rate of population growth, corruption in both high and low places, low rate of industrialisation and low productivity.

With the increasing and unprecedented wave of globalisation[20], many countries strive to derive optimum benefits from exports and foreign direct investment as well as to achieve the highest possible economic growth given various constraints. This study seeks to find out if the unemployment problem in Nigeria can be solved through economic growth, exports and foreign direct investment. The rest of the paper is organised as follows. Section 2 deals with conceptual issues while Section 3 and Section 4 contain theoretical issues and empirical literature respectively. Section 5 contains the methodology of the study while Section 6 contains results and analysis. And Section 7 concludes.

2. CONCEPTUAL ISSUES

2.1 Unemployment

There is apparently no precise definition of unemployment (Ajani & Okonta, 1986). The literature contains multifarious conceptualisations of the phenomenon. Unemployment is commonly used in relation to labour though it relates to all factors of production. Some experts have defined the term as a state of worklessness (Falae, 1971). But this definition is too broad/general to be satisfactory because some categories of people who are without work should not actually be regarded as unemployed in any meaningful sense. Unemployment has also been defined in some circles as a state in which people who can work are without jobs and are seeking for jobs for pay or for profit (Adebayo, 1999). This definition brings about the problem of measurement especially if one is interested in knowing the average rate of unemployment in the economy over a period of time (Adebayo, 1999). Unemployment has alternatively been defined as a situation where a part of the economically active population is without job but is available and seeking for work (Obadan & Odusola, 2000). Put differently, unemployment is a situation where people who are willing and able to work at the prevailing wage rate cannot find jobs (Dwivedi, 2001). The taxonomy of unemployment includes a condition of "being out of job", an activity of searching for job", an attitude of "desiring a job under certain condition" and "the need for a job" (Okigbo, 1986). In general, the problems associated with the conceptualisation of unemployment include the determination of those to be

[20] This refers to the growing economic interdependence of countries worldwide through the increasing volume and variety of cross-border transactions in goods and services and international capital flows, and also through the more rapid and widespread diffusion of technology [see Iyoha, M. (2006). Globalization and Nigerian Education in the 21st Century: Issues and Insights. *NESG Economic Indicators* 12(3), 37-42].

legitimately included as unemployed and the determination of the minimum period of being without job/search for employment that will qualify a person to be classified as unemployed.

2.2. Economic Growth

According to Professor Simon Kuznet[21], a Nobel Price winner in Economics, a country's economic growth refers to "a long-term rise in capacity to supply increasingly diverse economic goods to its population; this growing capacity is based on advancing technology and the institutional and ideological adjustments it demands". As observed in Ogwumike & Ozughalu (2001), the above definition implies that economic growth is synonymous with a sustained rise in national output, provision of wide range of economic goods, presence of improved technology, and institutional, attitudinal and ideological adjustments. In practice, increase in aggregate economic activity measured by gross domestic product (GDP) over a period of time, usually one year, is defined as economic growth (Dwivedi, 2001; Blanchard, 2009). In order to cater for inflation, nominal GDP is deflated by an appropriate price index - such as the consumer price index - to get real GDP. Also in order to cater for rapid population growth, GDP is divided by the population size to get GDP per capita. Thus real GDP per capita caters for both inflation and population growth. However, for countries where the population figures are not reliable it is expedient to use real GDP as a measure of aggregate economic activity and as the variable to account for economic growth.

2.3. Foreign Direct Investment

As observed in Ogunkola & Jerome (2006), there are several conceptualisations of foreign direct investment (FDI) in the literature. However, an agreed framework definition of FDI exists in the literature. This framework definition is that FDI is an investment made to acquire a lasting management interest (usually 10% of voting stock or ordinary shares) in a business enterprise operating in a country other than that of the investor defined according to residency; such investment may take the form of either "green field" investment (also called "mortar and brick" investment) or merger and acquisition which entails the acquisition of existing interest rather than new investment (Ogunkola & Jerome, 2006; Ayanwale, 2007). Foreign direct investment are financial transactions aimed at acquiring a lasting interest in a company in another country; the lasting interest implies that the direct investor has a long-term relationship with, and significant influence on, the management and policies of the foreign company (Ogunkola & Jerome, 2006). As further noted in Ogunkola & Jerome (2006), foreign direct investment usually takes place when a business organisation in one country obtains all or much of the share capital of a business organisation in another country, often through merger and acquisition. In corporate governance, it may be said that ownership of at least 10% of the ordinary shares or voting stock is a major criterion for the existence of direct investment relationship; ownership of less than 10% of the ordinary shares or voting stock is regarded as portfolio investment (Ayanwale, 2007). FDI is made up of not only mergers and acquisition and new investment but also reinvested earnings and loans and similar capital transfer between parent companies and their affiliates (Ogunkola & Jerome, 2006; Ayanwale, 2007). As noted in Ogunkola & Jerome (2006), countries usually act both as host to FDI projects in their own places and as participants in investment projects in other countries. Thus a country's inward FDI position is made up of the hosted FDI projects whereas the outward FDI position consists of the FDI projects owned abroad.

2.4. Exports

Exports generally refer to the purchases of domestic goods and services by foreigners (Blanchard, 2009). It is apparent from the above that exports are made up of two broad categories namely merchandise exports and exports

[2121] Kuznets, S. (1971). Modern Economic Growth: Findings and Reflections. A Nobel Lecture delivered in Stockholm, Sweden, December, and published in the *American Economic Review*, 63, September, 1973.

of various services. In the Nigerian context, exports are divided into oil exports and non-oil exports. Oil exports refer to exports of crude petroleum/crude oil and related products such as liquefied natural gas and other refined petroleum products. Non-oil exports, on the other hand, refer to exports of various agricultural commodities such as crops, livestock products, fisheries and forest resources; the exports of various manufactured products; and the exports of other products that are not directly associated with crude petroleum/crude oil. The sum of oil exports and non-oil exports make up total exports [see for instance, CBN (2004, 2007 & 2010)].

3. THEORETICAL ISSUES

The theoretical literature is full of support for the ability of economic growth, foreign direct investment and exports to provide the desired panacea to the problem of unemployment. Economic growth is expected to go with increase in output, income and employment. Thus economic growth is expected to bring about reduction in unemployment. For instance, Okun's law, among other things, states that increase in output leads to reduction in unemployment rate (Moosa, 2008, Blanchard, 2009). According to the law, the gap between an economy's full-employment output and its actual level of output increases by two percentage points for each percentage point the unemployment rate increases[22] (Abel, Bernanke & Croushore, 2011). The law in general implies that there is a negative relationship between unemployment and gross domestic product. Thus if real gross domestic product increases, all other things being equal, unemployment will fall whereas if real gross domestic product declines, all other things remaining the same, unemployment will rise. Indeed, economic growth that is inclusive and labour-intensive will, all other things remaining the same, generate significant employment opportunities that will greatly reduce the incidence of unemployment.

Coming to foreign direct investment, it is expected to reduce unemployment. As pointed out in Ogunkola & Jerome (2006), the potential contribution of foreign direct investment to economic growth and integration into the world economy is now widely recognised; in addition to providing capital inflows it can also boost the economic growth of a country by "crowding in" other investments with an overall increase in total investment as well as creating positive "spill over effects" from the transfer of technology, knowledge and skills to domestic firms; it can also stimulate economic growth by paving the way for high degree of competitiveness, significant innovation and improvements in a country's export performance. Foreign direct investment could be beneficial both in the short-run and the long-run. The positive effects of foreign direct investment on economic growth and productivity can pave the way for tremendous generation of employment opportunities. Indeed, foreign direct investment is expected to provide the requisite capital, technology and investment that would propel significant economic growth and greatly generate employment opportunities.

With respect to exports, it is expected to be positively related to employment. The export-led growth hypothesis implies that export promotion has some positive influence on growth of gross domestic product. The relevance of exports in boosting economic growth is adequately captured in the theoretical justification for international trade such as the pre-classical, the classical and the neo-classical theories of trade (Ozughalu, 2008). Exports are expected to generate employment opportunities by boosting economic growth and aggregate income. In general, exports are expected to bring about reduction in unemployment.

With the rapid and increasing wave of globalisation, many countries strive to optimise the benefits that accrue from this phenomenon. Globalisation leads to tremendous increase in exports and makes capital cheaper through foreign direct investment (Aktar & Ozturk, 2009). Globalisation helps countries to tremendously boost their

[22] As noted in Abel, Bernanke & Croushore(2011), in Okun's original work[Potential GNP: Its Measurement and Significance], the "Okun's law coefficient" was about 3 rather than 2, so each percentage point of cyclical unemployment was associated with a difference between actual output and full-employment output of 3 percentage points. Recent estimates put the Okun's law coefficient closer to 2.

economic growth through enormous trade volumes and capital flows as well as stupendous improvement in information and communication technology and other technologies that are relevant to production.

4. EMPIRICAL LITERATURE

There are many studies that relate to unemployment/employment, economic growth, foreign direct investment and exports. Aktar & Ozturk (2009) applied the vector autoregression techniques of variance decomposition and impulse response functions to investigate various interrelationships among foreign direct investment, unemployment, gross domestic product and exports in Turkey based on quarterly data for the period between 2000 and 2007. The study found that there is long-run or equilibrium relationship among the variables. The study also found, among other things, that economic growth, foreign direct investment and exports in general do not cure unemployment in Turkey. Moosa (2008), among other things, used autoregressive distributed lag models to analyse the relationship between economic growth and unemployment in four Arab countries namely Algeria, Egypt, Morocco and Tunisia for the period 1990-2005. The study found, among other things, that economic growth and unemployment are unrelated in all the four countries. Nambiar (1979) carried out a study on unemployment and exports for India; the paper utilised static input-output model and used data for two sample periods - 1963-64 and 1973-74. The study found, among other things, that exports contributed much less to employment generation in India; export promotion offered no substantial relief from unemployment problem in India. Rahman et al (2006) applied multivariate cointegartion methodology and vector error correction models to investigate the factors that contribute to economic growth and employment in Bangladesh; the study used data covering the period 1971-2002. The study found, among other things, that exports, foreign direct investment and external remittances enhance both economic growth and employment in the short-run. Tunah (2010) used cointegration, and Granger causality within error correction modelling framework to analyse the relationship among unemployment, real GDP, exchange rate and inflation; the study used quarterly data from 2002 to 2008. The study found, among other things, that GDP, inflation and previous level of unemployment affect unemployment on different levels but real effective exchange rate does not. Chang (2006) utilised the vector autoregression techniques of variance decomposition and impulse response functions to analyse the dynamic relationships among foreign direct investment, economic growth, unemployment and exports in Taiwan; the study used quarterly data from 1981:1 to 2003:3. The study found that economic growth and exports have positive impact on FDI inflow; export expansion has negative impact on FDI inflow; FDI inflow has positive impact on exports and economic performance; there is no relationship between FDI inflow and unemployment; there is positive relationship between economic growth and exports whereas there is negative relationship between unemployment and economic growth. Ayanwale (2007) used an augmented growth model estimated using the ordinary least squares and the Two-Stage-Least-Squares methods to ascertain the relationship among FDI, its components and economic growth in Nigeria; the study used data that covered the period 1970-2002. The study found, among other things, that the determinants of FDI in Nigeria are market size, infrastructure development and stable macroeconomic policy; and FDI in Nigeria contributes positively to economic growth. Obadan & Odusola (2000) employed Granger causality test and error correction modelling to investigate the relationship between productivity and unemployment in Nigeria based on data that covered between 1981 and 1996. The study found, among other things, that unemployment and productivity are inversely related. With respect to exports, there are many studies that have examined the relationship between exports and economic growth in various countries including Nigeria based on modern econometric methodology (see Ozughalu, 2008). The results are mixed; some support the export-led growth hypothesis, some support growth-driven export hypothesis, some support both hypotheses and some do not support any of the hypotheses.

In general, the studies that have analysed the impact of economic growth, foreign direct investment and exports on unemployment based on modern econometric methodology are very scanty. And there is apparently no study that have comprehensively examined if economic growth, foreign direct investment and exports could provide the desired cure for the problem of unemployment in Nigeria based on robust econometric methodology. This is part of the motivation for this study.

5. METHODOLOGY

We analyse the interrelationships among unemployment rate (UNPR), real gross domestic product (RGDP), real foreign direct investment (RFDI) and real exports (REXP). To get the real values the nominal values are deflated using the consumer price index. Data on the above variables are obtained from the Central Bank of Nigeria's Statistical Bulletins of 2004, 2007 and 2010 (i.e. CBN, 2004, 2007 & 2010). As observed by Obioma & Ozughalu (2005), it has become fashionable in contemporary econometric analysis to, among other things, rigorously consider issues of stationarity, co-integration and error correction mechanism when dealing with models involving time series variables. Stationarity assures non-spurious results; co-integration captures long-run or equilibrium relationship between or among (co-integrating) variables; and error correction mechanism is a means of reconciling the short-run behaviour of economic variables with their long-run behavior (Gujarati & Porter, 2009). We begin by testing for stationarity of the variables. The Augmented Dickey – Fuller (ADF) unit root test which is derived from Dickey & Fuller (1979, 1981) is used. It is known that when the number of observations is relatively low, unit root tests have little power (Chebbi & Lachaal, 2007). Therefore the ADF unit root test is complemented with the KPSS stationarity test which is derived from Kwiatkowski, Phillips, Schmidt & Shin (1992). Also, the Phillips-Perron unit root test is utilised (this test comes from Phillips, 1987, Perron, 1988 and Phillips & Perron, 1988). It is known that while the Augmented Dickey-Fuller approach accounts for the autocorrelation of the first-differences of a series in a parametric fashion by estimating additional nuisance parameters, the Phillips-Perron approach deals with the phenomenon in a non-parametric way. Indeed the Phillips-Perron unit root test makes use of nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms (Gujarati & 2009). As indicated in Idowu(2005), due to the possibility of structural changes that might have occurred during the time period covered by this study, the Augmented Dickey-Fuller test might be biased in identifying variables as being integrated. However, the Phillip-Perron test is expected to correct this shortcoming.

Our ADF test consists of estimating the following equation:

$$\Delta Z_t = \beta_1 + \beta_2 t + \delta Z_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Z_{t-i} + \varepsilon_t \quad \text{----------1}$$

where: ε_i is a pure white noise error term; t is time trend; Z_t is the variable of interest; β_1, β_2, δ and α_i are parameters to be estimated; and Δ is difference operator. In the ADF approach, we test whether δ =0.[23]

The Phillips-Perron test is based on the following statistic:

[23] In the ADF test, the null hypothesis is that the variable in question has a unit root (i.e. is not stationary).

$$\tilde{t}_\alpha = t_\alpha\left(\frac{\gamma_o}{f_0}\right)^{\frac{1}{2}} - \frac{T\left(f_o-\gamma_o\right)(se(\hat{\alpha}))}{2f_o^{\frac{1}{2}}s} \quad \text{---------- 2}$$

where: $\hat{\alpha}$ is the estimate; $\tilde{t}_\alpha$ is the t-ratio of α ; $se(\hat{\alpha})$ is the coefficient standard error; T is the sample size or number of observations; and s is the standard error of the test regression. In addition, γ_o is a consistent estimate of the error variance in the standard Dickey-Fuller test equation [calculated as (T-k)s^2/T, where k is the number of regressors]. The remaining term, f_0 , is an estimator of the residual spectrum at frequency zero.

The Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test differs from the unit root tests described above in that the series Y_t is assumed to be trend stationary under the null hypothesis. The KPSS statistic is based on the residuals from the Ordinary Least Squares (OLS) regression of Y_t on the exogenous variables X_t :

$$Y_t = X'_t\delta + \mu_t \quad \text{----------3}$$

The associated Lagrange Multiplier (LM) statistic is defined as: $LM = \sum_t S(t)^2/(T^2 f_o)$ -------- 4

where: f_o is an estimator of the residual spectrum at frequency zero and where $S(t)$ is a cumulative residual function: $S(t) = \sum_{r=1}^{t} \hat{\mu}_r$ ---------- 5; this is based on the residual from equation 3.

After finishing our tests for stationarity and if all our variables are found to be integrated of the same order, the next stage will be to conduct test of cointegration to see if there is a long-run or equilibrium relationship among the variables. Two popular cointegration tests are the Engel-Granger (EG) test and the Johansen test. The EG test is contained in Engel and Granger (1987) while the Johansen test is found in Johansen (1988) and Johansen and Juselius(1990). The EG test involves testing for stationarity of the residual from a behavioural equation containing the variables[24]. If the residual is stationary at level, it implies that the variables under consideration are cointegrated. The EG approach could exhibit some degree of bias arising from the stationarity test of the residual from the equation. As pointed out in Idowu(2005), the EG assumes one cointegrating vector in a system with more than two variables and it assumes arbitrary normalisation of the cointegrating vector. To address the foregoing shortcomings of the EG approach it is crucial to utilise the Johansen test. The Johansen cointegration test is a full information maximum likelihood approach. It is based on the following vector autoregressive (VAR) model of order p:

$$Y_t = A_1Y_{t-1} + \cdots + A_pY_{t-p} + BX_t + e_t \quad \text{----------6}$$

where: Y_t is a k-vector of non-stationary I(1) variables; X_t is a d-vector of deterministic variables; and e_t is a vector of innovations. One can rewrite this VAR as follows:

[24] Such as the following equation: $UNPR_t = a_0 + a_1RGDP_t + a_2RFDI_t + a_3REXP_t + e_t$

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_t \Delta Y_{t-i} + BX_t + e_t \quad \text{----------7}$$

where $\Pi = \sum_{i=1}^{p} A_i - I$, $\Gamma_i = -\sum_{j=i+1}^{p} A_j$ ----------8

Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank r<k, then there exist kxr matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' Y_t$ is I(0); r is the number of cointegrating relations(i.e the rank) and each column of β is the cointegrating vector. It is instructive to state here that the elements of α are known as the adjustment parameters in the vector error correction model. Johansen's approach is to estimate the Π matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of Π.

We will perform Granger causality tests within error-correction modelling framework if our variables are integrated of the same order and are cointegrated. Our causality tests will, among other things, clearly reveal the direction of causality among unemployment rate, real gross domestic product, real foreign direct investment and real exports. To begin with, we specify the following equations.

$$UNPR_t = a_0 + a_1 RGDP_t + a_2 RFDI_t + a_3 REXP_t + \mu_{1t} \quad \text{----------9}$$

$$RGDP_t = b_0 + b_1 RFDI_t + b_2 RGDP_t + b_3 UNPR_t + \mu_{2t} \quad \text{----------10}$$

$$RFDI_t = c_0 + c_1 REXP_t + c_2 UNPR_t + c_3 RGDP_t + \mu_{3t} \quad \text{----------11}$$

$$REXP_t = d_0 + d_1 UNPR_t + d_2 RGDP_t + d_3 RFDI_t + \mu_{4t} \quad \text{----------12}$$

where: a_0, b_0, c_0 and d_0 are constant terms; a_1, a_2, a_3, b_1, b_2, b_3, c_1, c_2, c_3, d_1, d_2 and d_3 are respective parameters; μ_{1t}, μ_{2t}, μ_{3t} and μ_{4t} are respective random error terms. We now specify the following error-correction model equations for the purpose of conduction our Granger causality tests.

$$\Delta UNPR_t = \alpha_1 + \sum_{i=1}^{p} \alpha_{2i} \Delta UNPR_{t-i} + \sum_{i=1}^{p} \alpha_{3i} \Delta RGDP_{t-i} + \sum_{i=1}^{p} \alpha_{4i} \Delta RFDI_{t-i} + \sum_{i=1}^{p} \alpha_{5i} \Delta REXP_{t-i} + \alpha_6 ecm1(-1) + \varepsilon_{1t} \text{-------13}$$

$$\Delta RGDP_t = \beta_1 + \sum_{i=1}^{p} \beta_{2i} \Delta RFDI_{t-i} + \sum_{i=1}^{p} \beta_{3i} \Delta REXP_{t-i} + \sum_{i=1}^{p} \beta_{4i} \Delta RGDP_{t-i} + \sum_{i=1}^{p} \beta_{5i} \Delta UNPR_{t-i} + \beta_6 ecm2(-1) + \varepsilon_{2t} \text{---14}$$

$$\Delta REXP_t = \delta_1 + \sum_{i=1}^{p} \delta_{2i} \Delta UNPR_{t-i} + \sum_{i=1}^{p} \delta_{3i} \Delta RGDP_{t-i} + \sum_{i=1}^{p} \delta_{4i} \Delta RFDI_{t-i} + \sum_{i=1}^{p} \delta_{5i} \Delta REXP_{t-i} + \delta_6 ecm4(-1) + \varepsilon_{4t} \text{---- 15}$$

$$\Delta RFDI_t = \lambda_1 + \sum_{i=1}^{p} \lambda_{2i} \Delta REXP_{t-1} + \sum_{i=1}^{p} \lambda_{3i} \Delta RFDI_{t-i} + \sum_{i=1}^{p} \lambda_{4i} \Delta UNPR_{t-i} + \sum_{i=1}^{p} \lambda_{5i} \Delta RGDP_{t-i} + \lambda_6 ecm3(-1) + \varepsilon_{3i} \text{---16}$$

where: ecm1(-1), ecm2(-1), ecm3(-1) and ecm4(-1) are one-period lagged values of residuals from equations 9, 10, 11 and 12 respectively.

In equations 13-16, the short-run causality is determined by the statistical significance of the differenced and lagged independent variables whereas the long-run causality is determined by the statistical significance of the error correction terms (see Al-Yousif, 1999; Arip, Yee & Abdul Karim, 2010). For instance, in equation 13, if the parameter estimates of the differenced and lagged values of real gross domestic product, real foreign direct investment and real exports are statistically significant it implies that the variables Granger cause unemployment rate in the short-run while if the parameter estimate associated with the error correction term is statistically significant it indicates that the variables Granger cause unemployment rate in the long-run.

We will also carry out variance decomposition and utilise impulse response functions. Variance decomposition estimates the forecast error components of one variable originating from the orthogonalised innovations of a dynamic system; it enables us to distinguish the relative importance of the economic variables in the model (Stock & Watson, 2001; Aktar & Ozturk, 2009). Impulse response, on the other hand, traces out the response of current and future values of each of the variables to a one-unit increase in the current value of one of the VAR errors, assuming that this error returns to zero in subsequent periods and that all other errors are equal to zero(Stock and Watson, 2001). It indicates the impact of shocks on the adjustment path of the variables (Hill, Griffiths & Lim, 2012). With respect to unemployment rate, the impact response functions, among other things, plot the responses of the variable to one standard deviation innovations or shocks to real gross domestic product, real foreign direct investment and real exports with $\pm$ 2 standard errors band.

6. RESULTS AND ANALYSIS

We now test for the stationarity of the variables in equations 9-12 using the ADF unit root test. The results are presented in Table 1 below.

Table 1: ADF Unit Root Test for the Variables in Equations 9-12

Variables	ADF Statistic (at first difference)	Order of Integration
UNPR	-5.981995(-3.724070)*	I(1)
RGDP	-6.277737(-3.724070)*	I(1)
RFDI	-7.731705(-3.724070)*	I(1)
REXP	-5.421152(-3.724070)*	I(1)

Source: Computed by the authors. Note: (a) MacKinnon critical values for rejection of hypothesis of unit root are in parentheses (b) Tests include intercept and trend. (c) The stars imply 1% level of significance.

Table 1 shows that all the variables are stationary at first difference; thus they are integrated of order one. We now conduct the Phillips-Perron(PP) test to complement the ADF test. The results are presented in Table 2 below.

Table 2: PP Unit Root Test for the Variables in Equations 9-12

Variable	PP Statistic (at first difference)	Order of Integration
UNPR	-6.073544(-3.724070)*	I(1)
RGDP	-6.296795(-3.724070)*	I(1)
RFDI	-8.903825(-3.724070)*	I(1)
REXP	-7.130668(-3.724070)*	I(1)

Source: Computed by the authors. Note: (a) MacKinnon critical values for rejection of hypothesis of unit root are in parentheses (b) Tests include intercept and trend. (c) The stars imply 1% level of significance.

Table 2 also shows that all the variables are stationary at first difference; thus they are integrated of order one. This confirms the ADF results.

We now conduct the KPSS stationarity test on the variables to further complement the ADF unit root test. The results are presented in Table 3 below.

Table 3: KPSS Stationarity Test for the Variables in Equations 9-12

Variable	KPSS Test Statistic (at first difference)	Order of Integration
UNPR	0.267784(0.739000)	I(1)
RGDP	0.153533(0.739000)	I(1)
RFDI	0.141597(0.739000)	I(1)
REXP	0.361375(0.739000)	I(1)

Source: Computed by the authors. Note: The figures in parentheses are the critical values at 1%.

The KPSS stationarity test results show that we cannot reject the null hypothesis of stationarity for the variables at first difference. Therefore, the KPSS test results further confirm the ADF unit root test that the variables in question are all stationary at first difference, that is, they are all integrated of order one.

We now test for cointegration of the variables in equations 9-12. We apply the Johansen test. Tables 4 and 5 present the Johansen cointegration test.

Table 4: Johansen Cointegration Test for the Variables in Equations 9-12: Trace Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Per cent Critical Value	Prob.**
None*	0.719490	56.14257	47.85613	0.0069
At most 1	0.436757	24.36395	29.79707	0.1855
At most 2	0.282891	10.01287	15.49471	0.2797
At most 3	0.065728	1.699683	3.841466	0.1923

Source: Computed by the authors. The single star(*) denotes rejection of the hypothesis at the 0.05 level. The double stars (**) indicate MacKinnon-Haug-Michelis (1999) p-values. Trace test indicates 1 cointegrating equation at the 5% level .

Table 5: Johansen Cointegration Test for the Variables in Equations 9-12: Maximum Eigenvalue Test

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Per cent Critical Value	Prob.**
None*	0.719490	31.77861	27.58434	0.0136
At most 1	0.436757	14.35108	21.13162	0.3369
At most 2	0.282891	8.313187	14.26460	0.3477
At most 3	0.065728	1.699683	3.841466	0.1923

Source: Computed by the authors. The single star (*) denotes rejection of the hypothesis at the 0.05 level. The double stars (**) indicate MacKinnon-Haug-Michelis (1999) p-values. Max-eigenvalue test indicates 1 cointegrating equation at the 5% level .

The Johansen cointegration test results (both the trace test and the maximum eigenvalue test) show that the variables in equations 9-12 are cointegrated. Therefore we will conclude that there is a long-run or equilibrium relationship among unemployment rate, real gross domestic product, real foreign direct investment and real exports.

The estimates of equations 13-16 are presented in Table 6 below. These are estimates of Granger causality within error correction modelling framework.

Table 6: Results of the Estimates of Equations 13-16

$\Delta\widehat{UNPR}_t$ =0.453833-0.041377 $\Delta UNPR_{t-1}$+7.82E-10 $\Delta RGDP_{t-1}$+1.05E-08 $\Delta RFDI_{t-1}$-8.50E-10 $\Delta REXP_{t-1}$-0.252396ecm1(-1)

(0.880639)	(0.420111)	(0.4.28E-09)	(4.60E-08)	(6.02E-09)	(0.224690)
0.515345*	-098481*	0.182699*	0.227821*	-0.141215*	-1.123311*
0.6123**	0.9226**	0.8570**	0.8222**	0.8892**	0.2753**

$\Delta\widehat{RGDP}_t$ =35577312-1.667544 $\Delta RFDI_{t-1}$-0.105919 $\Delta REXP_{t-1}$+0.225222 $\Delta RGDP_{t-1}$+34566587 $\Delta UNPR_{t-1}$-0.373928ecm2(-1)

(66427077)	(3.723017)	(0.458763)	(0.309281)	(31642063)	(0.344382)
0.535584*	-0.447901*	-0.230880*	0.728211*	1.092425*	-0.085793*
0.2094**	0.0903**	0.7580**	0.2727**	0.1707**	0.8447**

$\Delta\widehat{REXP}_t$ =47349767-12211789 $\Delta UNPR_{t-1}$-0.121640 $\Delta RGDP_{t-1}$-2.485537 $\Delta RFDI_{t-1}$+0.437646 $\Delta REXP_{t-1}$-0.7591915ecm3(-1)

(31766497)	(13496105)	(0.148473)	(1.893101)	(0.293321)	(0.358836)
1.490557*	-0.904838*	-0.819276*	-1.312945*	1.492037*	-2.115706*
0.1525**	0.3769**	0.4228**	0.2048**	0.1521**	0.0478**

$\Delta\widehat{RFDI}_t$ =-5810068-0.021968 $\Delta REXP_{t-1}$+0.142141 $\Delta RFDI_{t-1}$-1120694 $\Delta UNPR_{t-1}$-0.017963 $\Delta RGDP_{t-1}$-1.544306ecm4(-1)

(2615312)	(0.024141)	(0.229461)	(1071859)	(0.012942)	(0.350210)
2.221558*	-0.910002*	0.619455*	-1.045560*	-1.387963*	-4.409652*
0.0387**	0.3742**	0.5430**	0.3089**	0.1812**	0.0003**

Source: Computed by the authors. Note: The figures in parentheses are the various standard errors associated with the parameter estimates; the single starred figures are the associated t-statistics and the double starred figures are the associated probabilities.

As shown in the first segment of Table 6, the parameter estimates associated with lag of change in real gross domestic product, lag of change in real foreign direct investment, lag of change in real exports and the error correction term are not statistically significant at either 1% or 5%. This implies that, in both the short-run and the long-run, real gross domestic product, real foreign direct investment and real exports do not Granger cause unemployment rate. The second segment of the table shows that real foreign direct investment, real exports and unemployment rate do not Granger cause real gross domestic product in both the short-run and the long-run. The third segment of the table indicates evidence that unemployment rate, real gross domestic product and real foreign direct investment Granger cause real exports only in the long-run. The fourth segment of the table shows that real exports, real gross domestic product and unemployment rate Granger cause real foreign direct investment only in the long-run. We have used lag length of unity partly in order to keep the model simple in obedience to Occam's razor principle[25]. However, other lag lengths were tried but the length of unity was found to be optimal based on some statistical criteria including the Akaike Information Criterion (AIC).

The variance decomposition is shown in Table 7. From the decomposition it is clear that innovations in unemployment rate are explained mainly by its own variation. The impulse response functions are shown in the appendix. From the impulse response functions, it can be seen, among other things, that all the variables have permanent effects on their own innovations. Also, the impulse response functions reveal, among other things, that

[25] This is also known as the principle of parsimony. It says that models/descriptions should be kept as simple as possible unless and until proved inadequate.

one standard deviation innovations or shocks to real gross domestic product, real foreign direct investment and real exports would lead to negligible/insignificant responses in unemployment rate in virtually all the periods.

Table 7: Variance Decomposition

Variance Decomposition of UNPR					
Period	S.E.	UNPR	RGDP	RFDI	REXP
1	0.410133	100.0000	0.000000	0.000000	0.000000
2	0.517893	90.99044	0.601602	6.757006	1.650952
3	0.589281	84.58374	1.017038	8.223314	6.175908
4	0.635173	84.68389	1.173129	8.715585	5.427398
5	0.671597	84.52505	1.051560	9.500784	4.922603
6	0.694869	83.97447	0.984456	10.00575	5.035324
7	0.713458	83.56569	0.936467	10.05199	5.445853
8	0.729891	83.45379	0.905336	10.06545	5.575423
9	0.745126	83.27421	0.908929	10.14962	5.667245
10	0.759059	82.99248	0.939358	10.22068	5.847474
Variance Decomposition of RGDP					
Period	S.E.	UNPR	RGDP	RFDI	REXP
1	0.022022	1.523463	98.47654	0.000000	0.000000
2	0.032605	1.590150	97.10461	1.25E-05	1.305229
3	0.043918	1.761249	75.46943	0.133787	22.63553
4	0.052384	8.625191	62.41499	0.105785	28.85404
5	0.062321	21.27708	50.43146	1.058835	27.23262
6	0.073438	31.50530	40.86626	2.793560	24.83488
7	0.085484	38.89202	33.31934	4.021884	23.76675
8	0.098034	44.90844	27.53069	4.832163	22.72871
9	0.111120	49.82118	23.12540	5.537585	21.51584
10	0.124540	53.58083	19.80424	6.180078	20.43485
Variance Decomposition of RFDI					
Period	S.E.	UNPR	RGDP	RFDI	REXP
1	0.746933	1.793730	0.387528	97.81874	0.000000
2	0.828353	2.489271	0.349349	91.04374	6.117640
3	0.842245	5.399105	0.344932	88.18033	6.075638
4	0.855135	6.727898	0.820946	85.54385	6.907302
5	0.865967	8.270972	1.294658	83.47095	6.963417
6	0.874140	9.315680	1.454294	82.22755	7.002477
7	0.877566	9.691708	1.477345	81.84360	6.987344
8	0.878421	9.776901	1.511831	81.73384	6.977426
9	0.878897	9.825066	1.553908	81.64866	6.972371

10	0.879237	9.852843	1.582684	81.58965	6.974820
Variance Decomposition of REXP					
Period	S.E.	UNPR	RGDP	RFDI	REXP
1	0.169320	2.811610	8.700522	1.865424	86.62244
2	0.192831	10.56619	18.84254	1.440561	69.15071
3	0.213858	15.48804	16.47911	4.330189	63.70266
4	0.217736	14.94487	16.45036	5.751805	62.85296
5	0.219591	15.28428	17.16520	5.699489	61.85103
6	0.222532	15.43010	18.00212	5.870192	60.69759
7	0.225879	15.78075	18.22091	5.781709	60.21663
8	0.230174	17.20087	18.08030	5.657023	59.06180
9	0.235589	19.40034	17.77655	5.700341	57.12277
10	0.242103	21.78287	17.35513	5.865760	54.99624

Source: Computed by the authors. Cholesky Ordering: Unpr RGDP RFDI REXP

From the foregoing it is evident that economic growth, foreign direct investment and exports do not provide the desired panacea to the problem of unemployment in Nigeria. The estimates of this study show clearly that they do not have the desired impact on unemployment rate.

7. CONCLUSION

The problem of unemployment has become highly pronounced in Nigeria in recent times. This is most unfortunate given the fact that the country is blessed with abundant natural resources. The government has been making great efforts to tremendously boost economic growth, attract high volume of foreign direct investment and enormously increase exports. However, this study has shown that economic growth, foreign direct investment and exports do not provide the desired solution to the problem of unemployment in the country. Therefore adequate steps should be taken to ensure that economic growth, foreign direct investment and exports provide the desired panacea to the problem of unemployment in Nigeria. Suffice it to say that such steps will ultimately help the country to break the yoke of underdevelopment.

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APPENDIX: IMPULSE RESPONSE

Response to Cholesky One S.D. Innovations ± 2 S.E.